

REQUEST FOR PROPOSAL (RFP)
FOR
VENDOR PROCUREMENT AND IMPLEMENTATION SERVICES
FOR
Fire Alarm Systems Project

Issued By

Jefferson County

May 19, 2017

For further information regarding this RFP, contact:

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Jefferson County Human Services
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Jefferson, Wisconsin 53549
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Proposals must be received

By
4:00 p.m.
June 16, 2017

LATE PROPOSALS MAY BE REJECTED

REVISED 06-06-2017

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REQUEST FOR PROPOSALS FOR The County of Jefferson Fire Alarm Project

1.0 General Information

1.1 Summary

1. Jefferson County is soliciting proposals for the purchase, installation, and training of new fire alarm systems at the Hillside Office, Human Services, Lueder Haus, and Workforce Development buildings. Separate pricing for alarm panels and devices, installation labor and material, emergency call out function, (data lines included) and monitoring are required per building. A full addressable notification and initiating system is desired but a system with no more than 25 devices per loop will be acceptable. Pricing should include bringing all systems to current code if necessary.
2. Jefferson County will be soliciting proposals for the fire alarm equipment only in addition to a complete system for this RFP. Separate vendors may be selected to provide and/or install product.
3. Equipment vendor and install contractor to coordinate and submit plans to state for state approved plans

1.2 Project Description

1. The Hillside Building has no current fire alarm system installed and is in need of a code compliant fire alarm system including an emergency call out function. The new panel will require line voltage from a nearby electrical panel.
2. The Human Services Building has a fire alarm panel that is obsolete and needs to be replaced. Human Services may also need device replacement and an emergency call out function.
3. The Lueder Haus has a fire alarm system that is 23 years old and could use replacement and installation of an emergency call out function.
4. The Workforce Development building has a fire alarm system that is 18 years old and could use replacement and installation of an emergency call out function.

1.3 Project Director

Ryan Mundt, Jefferson County Maintenance Supervisor, will be responsible for providing overall direction of the project.

Contact Information:

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1541 Annex Rd
Jefferson, Wisconsin 53549
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1.4 Scope of Project

The project shall generally include, but not be limited to, the following:

1. Building surveys and/or walkthroughs to determine the exact needs for each location.
2. Specification of equipment and other necessary equipment required for the system.
3. Preliminary design letter, report, and/or drawings to identifying proposed solution and cost.
4. Installation of complete working systems
5. System approval from proper authorities
6. User training on system hardware and software

1.5 Information Provided by Jefferson County

Jefferson County will make available all buildings and will accommodate site visits by vendors during the RFP period. Jefferson County will provide CAD drawings for each building which will include a floor plan and current fire alarm system. Jefferson County will also provide test reports for each existing fire alarm panel upon request.

1.6 Proposal Schedule

May 19, 2017 RFP document made available.

May 22 – June 9, 2017 Required site visits

June 9, 2017 Deadline for questions.

To be considered for this project, please mail or hand deliver a proposal to the Project Director by 4:00 pm on

June 16, 2017. Proposals received before the

submittal deadline will be securely kept, unopened.

July 11, 2017 Vendor selected by Human Services.

July 11, 2017 Vendor approved by Infrastructure Committee.

July 11, 2017 Project approval by Jefferson County.

July 12 - August 25, 2017 Equipment vendor/Install contractor to acquire state approved plans and all necessary components

August 28, 2017 Installation begins.

November 3, 2017 Project completion

*All dates are estimated except for the date that proposals are due.

1.7 Clarification & Revisions

Any questions concerning the RFP should be directed to Ryan Mundt, Project Director, in written form via email at:

Email: ryanmu@jeffersoncountywi.gov

1541 Annex Rd

Jefferson, Wisconsin 53549

920-674-8179

Responses to all questions and any revisions/amendments and/or supplements to the RFP will be provided to all requestors of this RFP.

2.0 Preparing and Submitting a Proposal

2.1 General Information

The evaluation and selection of a company to perform the work will be based on the information submitted in the vendor's proposal plus references. A response may be rejected if it fails to meet each of the requirements of the RFP.

Elaborate proposals beyond that sufficient to present a complete and effective proposal are not necessary or desired.

2.2 Costs to Prepare RFP

The County is not liable for any cost incurred by proposers in replying to this RFP.

2.3 Submitting the Proposal

Proposers must submit four original copies of all materials required for acceptance of their proposal by the bid deadline addressed to the Project Director. Proposers should also include electronic PDF copies of the proposal as part of their submission.

2.4 Required Elements in Response

Vendors responding to this request shall provide the following information in their RFP response in the order listed herein. Proposals are not to exceed 20 pages.

2.4.1 Cover letter - The letter should be addressed to the Project Director at the address noted on the cover page and must contain, at a minimum, the following information limited to one page:

- Statement of interest in constructing the project
- Certification that the information and data submitted is true and complete to the best knowledge of the individual signing the letter
- The name, address, telephone number, and e-mail of the individual to contact regarding the submittal. An authorized principal or partner of the firm shall sign the letter
- A cost proposal

2.4.2 A description of the qualifications, experience, organization, and resources of the firm limited to two pages.

2.4.3 Experience with similar projects. Submit a detailed description of three previously completed, similar projects.

2.4.4 Qualifications of personnel that would be assigned to work on the project and their hourly billing rate, if applicable to the proposal. The respondent shall identify the function/responsibility of each individual identified (e.g. project manager, technician, etc.). Experience summaries of these key individuals shall be provided, with emphasis on previous experience in similar roles on similar projects (and particularly those identified under "Experience with similar projects"). If applicable, include a description of sub-contractors, indicating what portion of the work is to be done by them.

2.4.5 A timeline and total cost for the project.

3.0 Proposal Selection and Award Process

3.1 Selection Criteria

The County will select the contractor through a qualification-based selection process. Requests for Proposals will be reviewed based on the following factors:

1. Technical requirements
2. Cost
3. Experience with similar projects
4. Completeness of project approach
5. Ability to meet proposed work schedule

3.2 Right to Reject Proposals and Negotiate Contract Terms

The County reserves the right to reject any and all proposals and to negotiate the terms of the contract, including the award amount, with the selected proposer prior to entering into a contract. If contract negotiations cannot be concluded successfully with the highest scoring proposer, the County may negotiate a contract with the next highest scoring proposer. Alternatively, the County may elect to make no award. The selected vendor shall be entirely and completely responsible to make the system operate in a manner compliant with industry standards, the requirements of the County, and these specifications. The contractor will be accountable for proper installation and operation of the fire alarm system, even in the case that pertinent specifications are inaccurate, incomplete, unclear, or conflicting. Conflicting requirements shall be resolved in the best interests of the County. If the bidder detects any specifications or requirements that require resolution, he/she should bring them to the attention of the Project Director before the deadline for questions to be submitted.

4.0 Contract Terms and Conditions

4.1 Compensation for Services

The Project Director shall select the proposal deemed most suitable to the County's needs and enter into a Contract or Statement of Work for Equipment and Services for the work, subject to approval by the County of Jefferson. The project shall be negotiated and shall include an upset figure ("not to exceed") for total contract cost. The County does not pay for incidental costs.

**APPENDIX A – SYSTEM SPECIFICATIONS
TURNKEY EQUIPMENT PROVISION, INSTALLATION AND WARRANTY
/SERVICE FOR A FIRE ALARM SYSTEMS PROJECT
FOR
JEFFERSON COUNTY**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire-alarm control unit.
 - 2. Manual fire-alarm boxes.
 - 3. System smoke detectors.
 - 4. Heat detectors.
 - 5. Notification appliances.
 - 6. Magnetic door holders.
 - 7. Remote annunciator.
 - 8. Addressable interface device.
 - 9. Digital alarm communicator transmitter.
 - 10. System printer.

1.3 SYSTEM DESCRIPTION

- A. Non-coded, UL Listed intelligent analog addressable fire alarm system with multiplexed signal transmission.
- B. The System supplied under this specification must utilize independently addressed, input/output modules, power supply(s) as described in this specification. The system must contain fire alarm control panel, remote annunciator(s) and NAC power supply(s).
- C. All notification appliances must be capable of producing an audible temporal 3 tone and shall be synchronized through the facility and include low frequency audible sounder bases with building audible horns. All visual strobe appliances shall be synchronized throughout the facility.

1.4 SUBMITTALS

- A. The Contractor shall purchase no equipment for the system specified herein until Jefferson County (the Owner) has approved the project submittals in their entirety and has returned them to the contractor. It is the responsibility of the contractor to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the contractor

to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications. The Contractor shall submit three (3) complete sets of documentation within 30 calendar days after award of purchase order.

- B. Each submittal shall include a cover letter providing a list of each variation that the submittal may have from the requirements of the Contract Documents. In addition the Contractor shall provide specific notation on each Shop Drawing, sample, catalog cut, data sheet, installation manual, etc. submitted for review and approval, of each such variation.
- C. Product Data: Product Data sheets with the printed logo or trademark of the manufacturer of all equipment. Indicated in the documentation shall be the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. The proposed equipment shall be subject to the approval of the Owner.
- D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA72.
 - 2. Include voltage drop calculations for notification appliance circuits.
 - 3. Include battery-size calculations.
 - 4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 - 5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
 - 6. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
- E. Operation and Maintenance Data: For fire-alarm systems and components to be included in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data, include the following:
 - 1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
 - 2. Provide "Record of Completion Documents" according to NFPA72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
 - 3. Record copy of site-specific software database file, hardcopy print-out and CD, with password for delivery to the owner. Proprietary system/service companies will not be acceptable.
 - 4. Provide "Maintenance, Inspection and Testing Records" according to NFPA72 article of the same name and include the following:
 - a. Frequency of testing of installed components.
 - b. Frequency of inspection of installed components.
 - c. Requirements and recommendations related to results of maintenance.
 - d. Manufacturer's user training manuals (hardcopy) and electronic on CD.
 - 5. Manufacturer's required maintenance related to system warranty requirements.
 - 6. Abbreviated operating instructions for mounting at fire-alarm control unit.
 - 7. Copy of NFPA72.
- F. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application.
5. CD of site-specific software database file with password, and electronic product data sheets. Provide hard copy print-out of the software program. Proprietary system/service companies will not be acceptable.
6. Provide a complete system comparison report for each change implemented during the warranty period.
7. Provide a list of global system settings
8. Provide a list of the contents of each system cabinet and their settings
9. Provide a list of all addressable devices with their addresses and settings

1.5 QUALITY ASSURANCE

- A. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and application.
- C. NFPA Certification: Obtain certification according to NFPA72 in the form of a placard by an approved alarm company.

1.6 WARRANTY and SOFTWARE SERVICE AGREEMENT

- A. The contractor shall warranty all materials, installation and workmanship for one (1) year from date of acceptance, unless otherwise specified. A copy of the manufacturers' warranty shall be provided with closeout documentation and included with the operation and installation manuals.
- B. The System Supplier shall maintain a service organization with adequate spare parts stocked within 75 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the Owner notifying the contractor.
- C. Technical Support: Beginning with Substantial Completion, provide software support for one (1) year shall be included in this project.
- D. Detector Sensitivity Testing: Detectors shall test automatically.
- E. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within three (3) years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
 1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Ten extra set for access to locked and tamperproof components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling fire alarm system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.
- B. The Contractor shall provide, from the acceptable manufacturer's current product lines, equipment and components, which comply, with the requirements of these Specifications. Equipment or components, which do not provide the performance and features, required by these specifications are not acceptable, regardless of manufacturer.
- C. Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, and will accommodate the future requirements and operations of the building Owner. All specified operational features must be met without exception.
- D. All control panel assemblies and connected (new) field appliances shall be provided by the same System Supplier, and shall be designed and tested to ensure that the system operates as specified. All equipment and components shall be installed in strict compliance with the manufacturer's recommendations.
- E. Upon completion of the project the Owner shall be provided with a hard copy printout of the system software database and an electronic version of the system program and database with all required passwords.
- F. That equipment proposed to be supplied will be considered only if it meets all sections of the performance specification. Any deviations of system performance outlined in this specification will only be considered when the following requirements have been met:
 - 1. A complete description of proposed alternate system performance methods with three (3) copies of working drawings thereof for approval by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
 - 2. The supplier of alternate equipment shall furnish evidence that the proposed alternate system performance is equal to or superior than the system operation stated in the specification. Such evidence shall be submitted to the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
 - 3. The supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed system complies fully with the paragraph as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph as written, and the supplier feels the proposed system will accomplish the intent of the paragraph, a full description of the function as well as a full narrative description of how its proposal will meet its intent shall be provided. Any submission that does not include a point-by-point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed system does not comply.
 - 4. The supplier of alternate equipment shall submit a list from the alternate manufacture on the manufactures letterhead indicating the names and addresses of all authorized suppliers in the area. Proprietary products will not be considered.
 - 5. The acceptability of any alternate proposed system shall be the sole decision of the Owner or his authorized representative

- G. Approved Products: All panels and peripheral devices shall be of the standard product of single manufacturer and shall display the manufacturer's name of each component.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Flame detectors.
4. Smoke detectors.
5. Duct smoke detectors.(HVAC controls shall be included and figured with Automated Logic)
6. Verified automatic alarm operation of smoke detectors.
7. Automatic sprinkler system water flow.
8. Heat detectors in elevator shaft and pit.
9. Fire standpipe system.

- B. Fire-alarm signal shall initiate the following actions:

1. Activate the audible and visual notification appliances. All audible temporal 3 tone and visual flash shall be synchronized.
2. Identify alarm at fire-alarm control unit and remote annunciators.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
7. Recall elevators to primary or alternate recall floors.
8. Activate emergency shutoffs for gas and fuel supplies.
9. Record events in the system memory.
10. Record events by the system printer.

- C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. Low-air-pressure switch of a dry-pipe sprinkler system.
3. Elevator shunt-trip supervision.

- D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.
5. Abnormal ac voltage at fire-alarm control unit.
6. Break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at fire-alarm control unit or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or pre-action sprinkler system.

- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.

2.3 FIRE-ALARM CONTROL UNIT

- A. The control panel shall contain a microprocessor with 10/100 Ethernet media access controller (MAC). The system shall be designed specifically for fire detection, and notification applications. The control panel shall be listed and approved for the application standard(s) as listed under the General section. ~~Panel shall be EDWARDS model iO Series.~~
- B. The control panel shall include all required hardware, software and system programming to provide a complete and operational system. The control panel shall assure that life safety takes precedence among all panel activities.
- C. The control panel shall include the following capacities:
 - 1. Support one loop of 250 analog/addressable points, expandable up to two loops for a total of 500 points.
 - 2. Support up to 8 fully supervised remote annunciators.
 - 3. Support digital dialer with Contact ID format
 - 4. Support up to 1000 chronological events.
- D. The control panel shall include the following features:
 - 1. Ability to download or upload site applications and system diagnostics remotely through an Ethernet connection, or DACT. ~~Cellular connection is also acceptable~~
 - 2. Provide electronic addressing of analog/addressable devices. Rotary and dip switch addressing shall not be considered equal.
 - 3. Provide an operator interface display that shall include functions required to annunciate, command and control system functions.
 - 4. Provide an internal audible signal with different programmable patterns to distinguish between alarm, supervisory, trouble and monitor conditions.
 - 5. Provide system reports that provide detailed description of the status of system parameters for corrective action or for preventative maintenance programs. Reports shall be displayed by the operator interface or capable of being printed on a printer.
 - 6. Provide an authorized operator with the ability to operate or modify system functions like system time, date, passwords, restart the system and clear control panel event history file.
 - 7. Provide an authorized operator to perform test functions within the installed system.
- E. The control panel shall provide the following intelligent and intuitive diagnostic software tools.
 - 1. Fast Ground Check
Allow quick wiring diagnostics for ground faults every 4 seconds to troubleshoot ground faults much quicker and determine if they have been fixed or not.
 - 2. Recalibrate Device
The control panel recalibrates any devices that have been cleaned. The Recalibrate Device feature will immediately reset the environmental compensation and dirtiness levels for faster verification of cleaned devices.
 - 3. Test Fire
The control panel sends a test command to a detector or input module to activate. This allows for proper operation and programming testing of the device.
 - 4. Flash Device LED
It shall be possible to activate any device LED from the control panel menu to help troubleshooting or locate a specific device on a loop.
 - 5. Walk Test
Walk test will allow the operator to test individual zones or devices without placing an alarm event on the system.
It shall be possible to perform a walk test in a silent or audible test mode. Silent test mode shall display the test results on the LCD display. Audible test confirmation shall sound a coded signal on the systems NAC circuits.

It shall be possible to activate Walk Test by zone or device to ensure the balance of the system remains in service to protect the premises.

It shall be possible to view and print a walk test report showing the activation and restoration of all walk test events.

6. Device Maintenance

It shall be possible to view and print a report of all detectors dirtiness levels to optimize cleaning schedules. The report shall filter for all devices, devices that are 20% dirty or devices that are 80% dirty. The report shall show the device, how dirty it is by percentage and its sensitivity setting.

Detectors shall automatically send an alert message to the LCD Users Interface and illuminate the service detector LED when they reach 80% dirty and latch a trouble when they reach 100% dirty to ensure maintenance action is performed.

F. Main Operators Display Operations:

1. Provide a discreet system control switch provided for reset, alarm silence, panel silence, remote disconnect, drill switch, and up/down/right/left switches.
2. Backlit LCD display shall be 80 character display.
Each point shall have a 40 character custom message.
3. Service Detector LED: Provide indication when a detector needs servicing
4. Programmable Switches: Provide minimum of 2 programmable switches with corresponding LED . The switches shall be programmed for disable/enable or activate/restore functions as follows;
 - a. Disable NAC
 - b. Disable Elevator Recall
 - c. Disable Fan Shutdown
5. Alarm and Trouble Annunciator: Provide minimum of 32 zones of LED annunciation with red alarm and yellow trouble indicators; 8 zones may be utilized for supervisory zone annunciation. Devices on addressable loop circuits shall be identified by display or their address and by their condition (alarm, pre-alarm, monitor, supervisory, and trouble).

G. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions

H. Circuits Requirements:

1. Signaling Line Circuits for Intelligent Analog Addressable Loop:
 - a. Class B
 - ~~b. Class A for circuits with more than 50 devices~~
2. Notification Appliance Circuits:
 - a. Class B
 - b. Maximum circuit loading to 2.5 amps for notification appliance circuits
3. Activation of alarm notification appliances, elevator recall and other functions shall occur within 3 seconds after the activation of an initiating device.

I. Smoke-Alarm Verification:

1. Initiate an audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
2. Activate an NRTL-listed and -approved "alarm-verification" sequence at fire-alarm control unit and detector.
3. Record events by the system printer.
4. Sound general alarm if the alarm is verified.
5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.

- J. Elevator Recall:
1. Smoke detectors at the following locations shall initiate automatic elevator recall. Alarm-initiating devices, except those listed, shall not start elevator recall.
 - a. Elevator lobby detectors except the lobby detector on the designated floor.
 - b. Smoke detector in elevator machine room.
 - c. Smoke detectors in elevator hoist way.
 2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
 3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
 - a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.
- K. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.
- L. Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change to alternate settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.
- M. Digital Alarm Communicator Transmitter: The system shall have an integrated off premise communications capability using a digital alarm communications transmitter (DACT) for sending system events to multiple central monitoring station (CMS) receivers. The system shall provide the CMS(s) with point identification of system events using Contact ID protocol. The dialer shall have the capability to support up to two (2) individual accounts and to send account information to two (2) different receivers, each having a primary and secondary telephone access number. System events shall be capable of being directed to one or more receivers depending on event type or location as specified by the system designed. In the event of a panel CPU failure during a fire alarm condition, the DACT degraded mode shall transmit a general fire alarm signal to the CMS.
1. Digital data transmission shall include the following (Contact ID)
 - a. Address of the alarm-initiating device.
 - b. Loss of ac supply or loss of power.
 - c. Low battery.
 - d. Abnormal test signal.
 - e. Communication bus failure
- N. Ethernet Port: Provide a standard 10/100 Base T Ethernet port for connecting to an intranet or a local network. This connection shall support the downloading of configuration programming to the panel over the network, and provide the capability of diagnostic information from a remote location.
- O. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, shall be powered by nominal 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- P. Secondary Power: Shall provide 24 hours supervisory and 5 minutes of alarm with batteries, automatic battery charger, and automatic transfer switch.
- Q. NAC Power Supply: The NAC power supply shall be independent unit that will provide power to visual strobe notification appliances. It shall be possible to configure the NAC's to follow the main panel's NAC or activate from intelligent synchronized modules. The booster NAC's must be configurable to operate independently at any one of the following rates: continuous synchronized, or 3-3-3 temporal. Fault conditions on the power supply shall not impede alarm activation of host NAC circuits or other power supplies. The NAC power supply must be able to provide concurrent power for notification devices, security devices, access control equipment and auxiliary devices such as door holders. . All the NAC Power Supplies shall be synchronized. The power supply shall support up to 24 amp hour batteries.
1. Power supply shall be minimum of 10 amps and UL 864 Listed.
 2. Four independent 3amp NAC circuits. Each being configurable as auxiliary power.
 3. All circuits shall be synchronized.

REMOTE ANNUNCIATOR

- R. Remote LCD Annunciator: shall have LCD display functions for alarm, supervisory, and trouble indications and common system controls including; acknowledge/silence, signal silence, reset, drill, and lamp test. Annunciator must support a 24 LED expander. Shall be housed in a metal enclosure with key lock door.
- S. Remote LCD Annunciator: shall have LCD display functions for alarm, supervisory, and trouble indications and common system functions including; acknowledge/silence and lamp test. Annunciator must support a 24 LED expander. Shall be housed in a metal enclosure with key lock door.
- T. Remote LED Annunciator: shall have LED display functions for alarm, supervisory, and trouble indications and common system controls including; acknowledge/silence, signal silence, reset, drill, and lamp test. Annunciator must support a 24 LED expander. Shall be housed in a metal enclosure with key lock door. The key shall match the main control panel door lock.
1. This annunciator shall be EDWARDS, model RLCD or RLED series.

2.4 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 2. The manual pull station will have an intelligent module integral of the unit.
 3. Station Reset: key operated switch shall match the control panel key.
 4. Manual pull stations that initiated an alarm condition by opening the unit are not acceptable.
- B. Indoor Protective Shield: Factory-fabricated clear plastic enclosure. Hinged at the top to permit lifting for access to initiate alarm. Lifting the cover actuates an integral battery powered audible horn (when noted on the drawings) intended to discourage false-alarm operation.

- C. Weatherproof manual pull station shall be provided of red metal construction with special weatherproof gasket metal red box.
 - 1. Single-action operation.
 - 2. Station Reset: key operated switch shall match the control panel key.
 - 3. The intelligent monitor module will be located within the building and not with the station

2.5 INTELLIGENT ANALOG SYSTEM SMOKE DETECTORS

- A. General Requirements for Intelligent Analog Detectors
 - 1. Integral Microprocessor: All decisions are made at the detector determining if the device is in the alarm or trouble condition.
 - 2. Non-Volatile Memory: Permanently stores serial number, and type of device. Automatically updates historic information including hours of operation, last maintenance date, number of alarms and troubles, time of last alarm and analog signal patterns for each sensing element just before last alarm.
 - 3. Electronic Addressing: Permanently stores programmable system address. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable.
 - 4. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location and the device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.
 - 5. Sensitivity Range: Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive. It shall be possible to automatically change the sensitivity of individual analog/addressable detectors for the day and night periods. It shall be possible to program control panel activity to each level.
 - 6. Pre-Alarm: Detector stores 8 pre-alarm sensitivity values to alert local personnel prior to the sensor reaching a full evacuation sensitivity. Sensitivity values can be set in 5-10% increments.
 - 7. Environmental Compensation: The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure. Periodically, the sensing element real-time analog value shall be compared against its reference value. The detector shall provide a maintenance alert signal when the detector reaches 80% compensation has been used. The detector shall provide a dirty fault signal and illuminate Service Detector LED on control panel
 - 8. Twin Status LEDs: Flashing Green LED shows normal; flashing RED shows alarm state; steady RED and steady GREEN show alarm state in stand-alone mode, visible from any direction.
 - 9. UL Sensitivity Testing: The detector shall utilize a supervised microprocessor that is capable of monitoring the sensitivity of the detector. If the detector sensitivity shifts outside of the UL limits, a trouble signal is sent to the panel.
 - 10. Device Replacement: The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.
- B. Intelligent 3D Multi-sensor Detector (Photo/Thermal and Time)
 - 1. Provide intelligent analog addressable 3D multi-sensor smoke detector is an intelligent device that contains a photoelectric smoke sensor and a fixed-temperature heat sensor.

2. The heat sensing element shall be separate means of detection and annunciation from the smoke chamber. The 135F fixed-temperature heat sensor shall be UL 521 listed.
 3. The detector shall have a field replaceable smoke chamber.
- C. Intelligent Photoelectric Detector
1. Provide intelligent analog addressable photoelectric smoke detectors at the locations shown on the drawings.
 2. The detector shall have a field replaceable smoke chamber.
- D. Intelligent Carbon Monoxide Detector
1. Provide Intelligent CO Sensor is an intelligent device that uses a CO sensor to detect carbon monoxide from any source of combustion and analyzes the sensor data to determine when to initiate a life safety CO alarm. Carbon monoxide electrolytic sensing module shall provide toxic gas sensing to UL2034 and UL2075 standards.
 2. The detector signals to the control panel when the CO sensor reaches its end of life. The CO element shall be field replaceable.
 3. The CO Detector shall activate upon the following conditions:
 - a. 70 PPM for 60 – 240 minutes
 - b. 150 PPM 10- 50 minutes
 - c. 400 PPM 4 – 15 minutes
 4. The CO activation shall be programmable type as follows: Alarm, Supervisory Latching, Supervisory Non-Latching, Monitor Latching, or Monitory Non-Latching.
- E. Intelligent 135 Degree Fixed Temperature / Rate of Rise Heat Detector
1. Provide intelligent combination fixed temperature/rate-of-rise heat detectors at the locations shown on the drawings. The heat detector shall have a low mass thermistor heat sensor and operate at a fixed temperature and at a temperature rate-of-rise. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. Systems using central intelligence for alarm decisions shall not be acceptable. The intelligent heat detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C) and a rate-of-rise alarm point of 15°F (9°C) per minute. The heat detector shall be rated for ceiling installation at a minimum of 50 ft. (21.3 m) centers and be suitable for wall mount applications.
- F. Intelligent Fixed Temperature Heat Detector
1. Provide intelligent fixed temperature heat detectors at the locations shown on the drawings. The heat detector shall have a low mass thermistor heat sensor and operate at a fixed temperature. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. Systems using central intelligence for alarm decisions shall not be acceptable. The heat detector shall have a nominal alarm point rating of 135°F (57°C). The heat detector shall be rated for ceiling installation at a minimum of 50 ft. (21.3 m) centers and be suitable for wall mount applications.
- G. Intelligent Multi-Sensor Detectors Types
1. Multi-criteria sensor can be any combination of photoelectrical smoke sensing, heat and carbon monoxide (CO) detection. The combined photoelectric smoke detection/heat/CO module shall have separate sensors that adjust the detection profile in response to the input from the sensors.
 2. Multi-criteria detector can be combination of photoelectrical smoke sensing and carbon monoxide (CO) detection.
 3. Multi-criteria detector can be combination of fix-temperature heat and carbon monoxide (CO) detection.

4. All the Multi-Sensor detector shall use only one address on the SLC.
 - a. The CO activation shall be programmable type as follows: Alarm, Supervisory Latching, Supervisory Non-Latching, Monitor Latching, or Monitor Non-Latching.

H. Detector Base Types

1. Provide standard detector mounting bases suitable for mounting on 1-gang, or 4inch octagon box and 4 inch square box. The base shall, contain no electronics and support all series detector types. Bases with electronics or dip-switches are not acceptable.

I. Audible Base – 520hz Low Frequency

1. Provide low frequency 520hz audible detector mounting bases suitable for mounting on 4" square x 2-1/8" (54 mm) deep box.
2. The operation of the audible base shall be controlled by its respective detector processor or under program control as required by the application. The base shall support all Signature Series detector types and be capable of single or group operation. The audible base shall emit a temporal 3 alarm tone and/or temporal 4 tone.
 - a. The audible bases shall be UL268 and UL464 Listed, and provide a nominal sound level of 87 dBA at 10 ft.(3m).
3. All low frequency sounder bases audible temporal 3 tone shall be synchronized through the facility. Including with building audible horns.

J. Intelligent Duct Smoke Detector - Photoelectric

1. Provide intelligent photoelectric duct smoke detector at the locations shown on the drawings.
 - a. One form C auxiliary alarm relay rated at 2amps @ 30Vdc.
 - b. The operating range shall be 100ft/min to 4,000ft/min air velocity and temperature range of –20 to 158F.
 - c. Sample tube can be installed with or without the cover plate and be rotated in 45-degree increments to ensure proper alignment with duct airflow.
 - d. Local magnet-activated test switch.
2. Provide remote test station with Alarm LED and Key Switch..
3. Relay Fan Shutdown: Rated to interrupt fan motor control circuit. Furnish and install separate device for each motor start. Connect to motor start as required for fan shutdown during alarm condition.

K. Beam Smoke Detectors

1. Provide reflective beam type smoke detectors at the locations shown on the drawings. This detector shall consist of an integrated transmitter and receiver capable of being powered separately or together.
2. The detector shall operate in either a short range of 15 to 160 ft. or a long range of 160 to 330 ft. The detector shall feature a bank of alignment LEDs on both the receiver and transmitter to ensure proper alignment without the use of special tools.
3. The detector shall utilize an automatic gain control to compensate for gradual signal deterioration from dirt accumulation on lenses. The beam smoke detectors shall be powered from the system control panel. Testing shall be carried out using calibrated test filters.
4. Provide a remote key activated remote test station.
 - a. Provide Beam Smoke Detector, model EC-50R or EC-100R with EC-LLT Test Station.

2.6 INTELLIGENT MODULES

- A. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable. The personality of multifunction

modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller.

1. Integral Microprocessor: All decisions are made at the module determining if the device is alarm or trouble condition. Each module provides its own ground fault detection.
 2. Non-Volatile Memory: Permanently stores serial number, and type of device. Automatically updates historic information including hours of operation, number of alarms and troubles, time of last alarm.
 3. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location. The device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.
 4. Twin Status LEDs: The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status.
 5. Input and output circuit wiring shall be supervised for open and ground faults.
 6. Two styles of modules shall be available, those designed for gang box mounting, and where multiple modules are required in a single location, plug in modules shall be provided with a Universal Input/Output motherboard.
- B. Intelligent Input Module. The Input Module shall provide one or two supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The single input module shall support the following circuit types:
- Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
 - Normally-Open Alarm Delayed Latching (Water flow Switches)
 - Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
 - Normally-Open Active Latching (Supervisory, Tamper Switches)
- C. Intelligent Relay Module. Provide addressable control relay circuit modules shall provide one (1) form C dry relay contacts rated at 24Vdc @ 2 amps (pilot duty) to control external appliances or equipment. The position of the relay contact shall be confirmed by the system firmware. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers..
- D. NAC Control Module: Provide intelligent NAC control module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. The gang box -mounted version shall be suitable for mounting in North American 2 ½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The plug-In version shall plug into a universal multi-module motherboard. The NAC control module shall support the following operations:
- 24volt NAC circuit
 - Audio notification circuit 25v or 70v
 - Telephone Power Selector with Ring Tone (Firefighter's Telephone)
 - Visual Synchronized Output to Genesis appliances or to NAC Power Supply.
- E. Sounder Base Tone Control Module: Provide intelligent temporal pattern generator is an addressable device that generates sound patterns for fire (Temporal 3) or carbon monoxide (Temporal 4) to sounder bases. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. NAC control module shall support the following operations:
- 24volt NAC circuit
 - Synchronized audible tone to all sounder bases and building audibles.

- Alarm signal continues until the system resets or is manually silenced from the control panel.
- Visual Synchronized Output to Genesis appliances or to NAC Power Supply.

F. FA Elevator Interface Cabinet

1. Provide red metal cabinet enclosure with word FIRE in white letters on the cover. Inside will be four intelligent relays (Primary Recall, Alternate Recall, Fire Hat and Shunt Trip), one monitor input (Shunt Trip AC Power Supervision) and 120vac relay (Shunt Trip AC Power Supv).
2. Label all the relays and input modules for the function.

2.7 NOTIFICATION APPLIANCES

- A. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturers' instructions.
- B. All appliances shall be wall or ceiling mounted white, and shall be UL 1971 & UL 464 listed Fire Protective Service.
- C. Notification Appliances – Visual
 - 1. Provide strobes with in-out screw terminals shall be provided for wiring. Strobes shall provide a smooth light distribution pattern field selectable candela 15 cd, 30 cd, 75 cd, and 110 cd flash output rating. The strobe (15, 30, 75, 110) candela rating shall be view from the side window to verify the setting. All strobes shall be synchronization to within 10 milliseconds for an indefinite period shall not require the use of separately installed remote synch modules. The strobes shall mount to one-gang electrical box.
 - 2. The device shall have plastic protective cover for during installation.
 - 3. The actual candela setting on the visual shall be marked on the appliance.
- D. Notification Appliance – Low Frequency Horn 520Hz
 - 1. Provide low frequency 520hz audible detector mounting bases suitable for mounting on 4" square x 2-1/8" (54 mm) deep box. The audible base shall produce tone sound within the frequency range of 520 Hz \pm 10% square wave tone.
 - 2. The operation of the audible base shall be controlled by its respective detector processor or under program control as required by the application. The base shall support all Signature Series detector types and be capable of single or group operation. The audible base shall emit a temporal 3 alarm tone and/or temporal 4 tone.
 - a. The audible bases shall be UL268 and UL464 Listed, and nominal sound level shall be 87dBA in anechoic chamber and 80 dBA in reverberant room, listed.
 - b. All low frequency sounder bases audible temporal 3 tone shall be synchronized through the facility. Including with building audible horns.
- E. Notification Appliance – Horn/Strobe
 - 1. Provide low profile wall mount horn/strobes at the locations shown on the drawings. The horn/strobe shall provide an audible output of 95 dBA at 10 ft. when measured in reverberation room per UL-464. Strobes shall provide synchronized flash outputs. The strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd & 110cd devices. The horn shall have a selectable steady or synchronized temporal output. In and out screw terminals shall be provided for wiring. Low profile horn/strobes shall mount to one-gang box.
 - 2. The device shall have plastic protective cover during installation.

2.8 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
 - 1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
 - 2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
 - 3. Rating: 120-V ac, 24-V ac or dc.

2.9 INSPECTION BAR CODES

- A. Inspection bar codes shall be installed on all initiating devices, annunciators, control panels and power supplies.
- B. Inspection bar codes used by the system must utilize Code 3 of 9 or other approved format, and contain a minimum of eight (8) digits that comprise a unique serial identifier within the Web-based Reporting System. There shall be no duplication of serial numbers. Serial number shall be printed below the bar code for identification purposes.
- C. Inspection bar codes shall be limited in size to no more than 2" (5cm) in width, and 3/8" (2 cm), in height and shall include a Mylar[®] or other protective coating to protect the bar code from fading due to sunlight or exposure.
- D. Inspection bar codes shall be installed on each device in such a manner as to require that scanning of the bar code take place no further than 12" from the device during inspection.

2.10 WIRE AND CABLE

- A. Signaling Line Circuits – Annunciator Data: Twisted pair, not less than No. 18Awg or as recommended by the manufacturer.
- B. Signaling Line Circuits – Intelligent Loop: Twisted pair, not less than No. 18Awg or as recommended by the manufacturer.
 - 1. Existing wiring may be reused as long as it is in good shape, free of electrical noise, and meets the requirements of National Electrical Code and local AHJ.
- C. Notification Appliance Circuits –
 - 1. Horn and Visual. 14 or 12AWG as recommended by the manufacturer.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA72 for installation of fire-alarm equipment.
- B. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches above the finished floor.
- C. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
 - 1. Connect new equipment to existing control panel in existing part of the building.
 - 2. Connect new equipment to existing monitoring equipment at the supervising station.
 - 3. Expand, modify, and supplement existing equipment as necessary to extend existing functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- D. Smoke- or Heat-Detector Spacing:
 - 1. Comply with NFPA72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 - 2. Comply with NFPA72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 - 3. Smooth ceiling spacing shall not exceed 30 feet.
 - 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
 - 5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
 - 6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
- E. Duct Smoke Detectors: Comply with NFPA72 and NFPA90A. Install sampling tubes so they extend the full width of duct. (HVAC controls shall be included and figured with Automated Logic)
- F. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
- G. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.
- H. Notification Appliance Devices: Install between 80 and 96 inches on the wall.
- I. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.
- J. Annunciator: Install with top of panel not more than 56 inches above the finished floor.

3.2 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 8 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Smoke dampers in air ducts of designated air-conditioning duct systems.
 - 2. Alarm-initiating connection to elevator recall system and components.
 - 3. Alarm-initiating connection to activate emergency lighting control.
 - 4. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
 - 5. Supervisory connections at valve supervisory switches.
 - 6. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
 - 7. Supervisory connections at elevator shunt trip breaker.
 - 8. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
 - 9. Supervisory connections at fire-pump engine control panel.

3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 16 Section "Electrical Identification."
- B. Install framed instructions in a location visible from fire-alarm control unit.
- C. All initiating devices shall have bar code label installed visibly on the device. This bar code shall be used for digital inspection of the fire alarm system using Building Reports.Com.

3.4 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.5 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by Architect, Engineer and authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72; retain the "Initial/Reacceptance" column and list only the installed components.
2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.

E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

F. Fire-alarm system will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

I. Annual Test and Inspection: During the warranty period, each year test fire-alarm system complying with visual and testing inspection requirements in NFPA72. Use forms developed for initial tests and inspections.

J. Detector Sensitivity Testing: During the warranty period, each year the contractor is to perform detector sensitivity testing and provide report to the Owner. Unless, the system is UL Listed to perform automatic sensitivity testing without any manual intervention and should detector fall outside of sensitivity window, the system will automatically indicated a devices trouble. A copy of UL letter is to be provided as proof of system operation

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.